

Weiss, et al.

Attorney Docket No. P05185US1

REMARKS**OVERVIEW**

Currently pending in this application is claims 1-29 and 33. Claims 30-32 were previously withdrawn. The present response is an earnest effort to place all claims in proper form for allowance.

REJECTION UNDER 35 U.S.C. § 102

Claims 1-9, 12, 16-21 and 33 are rejected under 35 U.S.C. § 102(b) as being anticipated by Marukawa et al. (U.S. Patent 5,627,090). Marukawa has two resist layers, a lower resist layer (Fig. 2: 5) that covers the parent structure and an upper resist layer (Fig. 2: 6) formed on the lower resist layer (Fig. 2: 5). A metal layer (Fig. 4: 7) is deposited on the upper resist (Fig. 4: 6) layer. The upper and lower resist layers must be made of different materials or else the layers would not be distinct.

The present invention (claim 1, Figures 1-4) specifies only one resist material, that can, however, be several (4, for example) layers thick (Fig. 3: 16, 18, 20, 22 & 23), that both covers the parent structure and supports a metal layer deposited thereon. The language of claim 1 is clearly in the singular for the resist: "a multilayer organic molecule resist," "the multilayer organic resist" and "the multilayer organic molecule resist." There is no "upper" and "lower" resist layers because the entire resist structure is made of the same materials.

An anticipation rejection requires a showing that each element of the claim is found in a single reference, practice or device. In re Donohue, 766 F.2d 531, 534, 226 U.S.P.Q. 619, 621 (Fed. Cir. 1985). The absence of a single claimed element from a cited reference precludes a finding of anticipation. Atlas Powder Company v. E.I. du Pont de Nemours, 750 F.2d 1569, 1574, 224 U.S.P.Q. 409, 411 (Fed. Cir. 1984). Murakawa has resist layers made of two different materials wherein the present invention, claim 1, requires resist layers made of only one material.

Also, claim 1 is directed towards "manufacturing nanostructure patterns". Murakawa only reveals larger structures, micron sized, as is presented in column 9, lines 19-20 and column

Weiss, et al.

Attorney Docket No. P05185US1

11, lines 8-9. The present application reveals nanostructure patterns on page 10 and Figures 6 and 7.

Now that independent claim 1 is allowable, so are dependent claims 2-9, 12, 14, 16-21 and 33. However, the below claims have additional reasons for patentability.

Claims 2 and 3 of the Application specify removing the organic resist by chemical (Specification, p. 9, lines 7-13) and electrochemical means (Specification, p. 12, lines 2-9, respectively. The Examiner states that Marukawa discloses the electrochemical removal of the resist (Marukawa, col. 8, lines 29-53). The Applicants respectfully disagree and do not find this information in the cited section. Additionally, there is nothing in Marukawa that specifies resist removal by chemical means.

Claim 12 of the present invention specifies that the substrate is silicon (Specification, p. 6, lines 6-7). The Examiner states that Marukawa discloses that the substrate is silicon. The Applicants respectfully disagree and do not find this information in the cited section (column 8, lines 16-20). Marukawa merely specifies that the substrate is a semiconductor.

Claim 14 of the present invention specifies that the layers of the multilayer organic molecule resist are connected with ions (Specification, p. 8, lines 27-28), specifically Cu^{2+} (claim 15). The Examiner states that Marukawa discloses that the layers of the multilayer organic molecule resist are connected with ions, specifically Cu^{2+} . The Applicants respectfully disagree and do not find this information in the cited section (column 8, lines 2-39).

Claims 16-18 of the present invention specify the smoothing of at least one parent structure, chemically or electrochemically (Specification, p. 11, lines 18-19). The Examiner states that Marukawa discloses smoothing (col. 8, lines 8-13). The Applicants respectfully disagree and do not find this information in the cited section (column 8, lines 8-13).

Claim 20 of the present specification specifies the designing of at least one parent structure to have at least one concave segment (Specification, p. 12, line 30, Figures 2-3). The Examiner states that whether the parent structure has a concave segment depends upon the desired result one wants to obtain. The Applicants do not believe that this statement is sufficient

Weiss, et al.

Attorney Docket No. P05185US1

to anticipate this claim. Nowhere does Murakawa teach a parent structure with at least one concave structure.

REJECTION UNDER 35 U.S.C. § 103

Claims 10-11, 13, 15 and 22-29 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Murakawa and further in view of Hoechst AG (1999 Derwent Information Ltd. 1976-32210X) and Dai et al. (U.S. 6,232,706).

Now that independent claim 1 is now allowable, so are dependent claims 10-11, 13, 15 and 22-29. However, the below claims have additional reasons for patentability.

Regarding claims 13 and 15, the rejections are based on a false reading of the Hoechst Abstract. The Abstract is cryptic and cannot support a rejection. The Examiner states that the abstract discloses a mercaptoalkanoic acid as the organic molecule resist. This is incorrect. The cover page of the Canadian Patent (CA 1075955) that the Hoechst abstract is derived from reveals that the molecule actually used is a benzene mercapto alkanoic acid amide derivative. Note that the Hoechst abstract does not actually refer to a "mercaptoalkanoic acid" alone, but to an "aromatic amide of a mercaptoalkanoic acid." Secondly, there is absolutely no indication in this reference that each layer of organic molecules is connected with Cu^{2+} .

Even if there was some suggestion or motivation to combine Hoechst with Murakawa with a reasonable expectation of success, the combination or modification cannot render the claimed invention obvious if the combination or modification does not teach a claim limitation. All claim limitations are significant, and must be given weight and effect vis-a-vis the patentability of the claims. Application of Saether, 492 F.2d 849, 852 (C.C.P.A. 1974). If even a single claim limitation is not taught or suggested by the prior art, then that claim cannot be obvious over the prior art. Application of Glass, 472 F.2d 1388, 1392 (C.C.P.A. 1973). Both the limitations of claims 13 and 15 are not taught by the combination of Hoechst and Murakawa.

Claims 23-25 refer to smoothing the residual structure. The Examiner states that Dai, in the Abstract, discloses smoothing a nano structure electrochemically. This is simply incorrect.

Weiss, et al.

Attorney Docket No. P05185US1

The Abstract does not disclose anything of the sort. It is noted that Dai does not even contain the word "smoothing" in the Abstract or anywhere else.

In re claims 22 and 26-29, the Examiner states that it would have been obvious to one of ordinary skill in the art of making semiconductor devices to apply the techniques as taught by Marukawa to overlay a second multilayer organic molecule resist on the at least a portion of the residual structure; depositing a layer over the residual structure and in contact with at least a portion of the second multilayer organic resist; and removing the second multilayer organic molecule resist to leave a second residual structure to designing the residual structure to reduce the second residual structure. This language is taken from claim 22. The Examiner fails to specify where in Marukawa is this teaching. The Applicants respectfully submit that there is no such teaching in Marukawa. As said before, if even a single claim limitation is not taught or suggested by the prior art, then that claim cannot be obvious over the prior art. Application of Glass, 472 F.2d 1388, 1392 (C.C.P.A. 1973).

Applicants further submit that there are significant secondary indicia of nonobviousness for the present invention. The chemistry world certainly did not consider the invention to be obvious as the nanolithography technique of the present invention was recognized by the industry as being worthy of "News of the Week" and was one of only 24 "News of the Year" advances. See attached Exhibit A.

Based on the foregoing, Applicants respectfully submit that the pending claims are in condition for allowance at this time, as they are patentably distinguishable over the prior art. Accordingly, reconsideration of the application and passage to allowance are respectfully solicited.

CONCLUSION

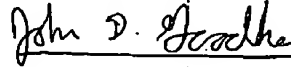
No fees or extensions of time are believed to be due in connection with this amendment; however, consider this a request for any extension inadvertently omitted, and charge any additional fees to Deposit Account No. 26-0084.

Weiss, et al.

Attorney Docket No. P05185US1

Reconsideration and allowance is respectfully requested.

Respectfully submitted,



JOHN D. GOODHUE, Reg. No. 47,603
McKee, Voorhees & Sease, P.L.C.
801 Grand Avenue, Suite 3200
Des Moines, Iowa | 50309-2721
Phone No: (515) 288-3667
Fax No: (515) 288-1338
CUSTOMER NO: 27407

Attorneys of Record

- bja -